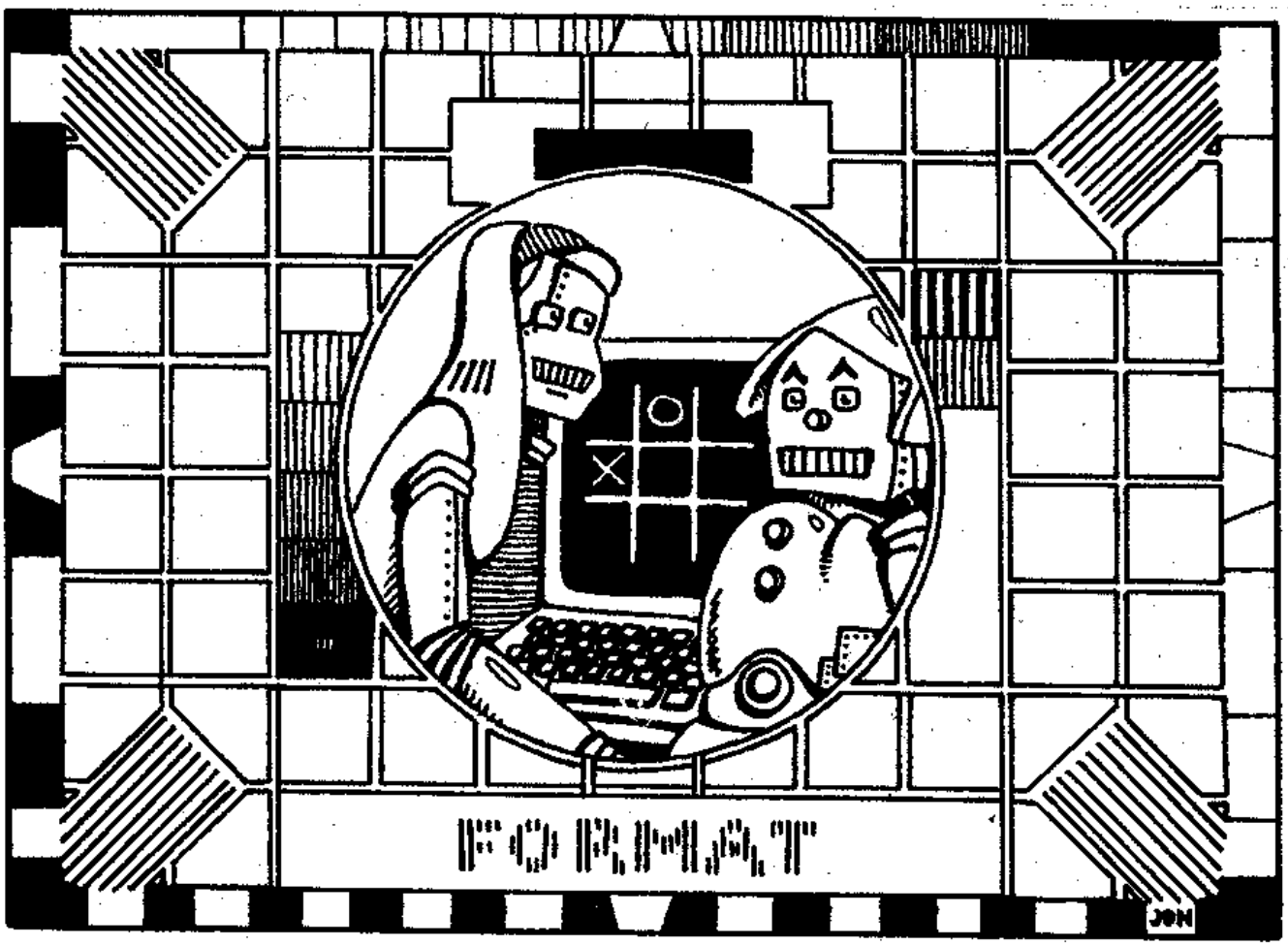
Vol 2 - No 12. August 1989.

FORMAT

THE MONTHLY MAGAZINE FOR
SPECTRUM, DISCiPLE & PLUS D USERS



T.V. Test Cards
From Your Spectrum

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Following my request, a couple of months ago, for ideas to expand the readership of FORMAT, I have still only received a handful of letters. Now remember the estimate of the number of Spectrum users who would benefit from FORMAT was 150,000 (10% of the 1.5 million Spectrums in circulation). Its appears to be the norm that each copy of FORMAT is read by at least two people and I know of several cases where its many more than two. Now if only half those people were to buy their own copy FORMAT could be 40-50% larger, that could mean an extra 16 pages a month.

Right, so if a bigger FORMAT is not incentive enough to persuade you to get your friends to buy their own copies, lets make you an offer you can't ignore.

EXTRA Copies of FORMAT
and
The Chance to WIN £££££

With this issue you will find a special subscription form for you to give to your friends, you can photocopy it as many times as you like or ask us to send you some more copies. Simply fill in you membership number and details in the space provided, then hand it to your friend. When your friends membership has been processed by us we will add an extra month to your own subscription and send you a draw ticket. That's 1 EXTRA months FORMAT and 1 Draw Ticket for EACH new member you introduce.

So what's the draw ticket for? Well until the 31st December 1989 we'll be running a SPECIAL FUND where the £££££ will be mounting up. For every new member introduced on the special form we will add 50p to the fund. So for each new member you introduce you get a draw ticket and a chance to win this POT of gold.

Thats right, the LUCKY WINNER will receive a cheque for the TOTAL VALUE of the fund. What's its going to be worth? Well thats up to you. The more new members, the more money in the pot. And the more new members you introduce, the more chances you have to WIN.

So now you have several very good excuses for introducing your friends (or even strangers) to FORMAT.

Now on to other things, this is the largest issue we've published so far - a full 36 pages. Not bad! especially when you remember that the U.K. membership rate has remained unchanged since we started, way back in 1987. Which leads me onto next months EVEN BIGGER ISSUE. Yes - our 2nd Birthday Issue, lots of very special things - dont miss it.

Still on the subject of size, I have had several letters, and quite a few phone calls, pointing out that last months FORMAT was even bigger than the July issue of Crash. What are they doing at Crash?

Finally, a request for information. We are going to compile a directory of companies who repair Spectrums and/or peripherals. If you know of a company, or better still if you have experience (good or bad) of the service a repair company gives, drop us a line with details.

Bye for now.

Bob Brenchley. Editor.

NEWS ON 4

NEXT IS GONE.

CEEFAX, the BBC teletex service, has dropped its micro magazine NEXT. Page 701 on BBC 2 has long been the page for computer fans to turn to. But on Friday 30th of June NEXT came to an end. No explanation was given and my contact at the BBC was unable to find out why NEXT had received the chop.

TWO NEW SHOWS

Two new 'Multi-Format' shows have been announced. The Spring Computer Show will be held at Olympia in London from 4th to 6th of May. Aimed at home and education users the show is being organized by Focus Events part of the group that publishes Popular Computing Weekly.

The Computer Shopper Show is another new show this time scheduled for the autumn. Set for November 24th to 26th 1989 it will be held at Alexandra Palace. The show is organized by Database Exhibitions who used to put on the Amstrad, Commodore, Acorn and Atari shows (which the new show will replace). Entry will be £4 for adults, £3 for under 16s, which seems a bit expensive for a home computer show.

DIXONS AND THE +2A

A mole at DIXONS indicates that sales of the +2A computer have caused major problems. With software and hardware compatability problems many people are returning the machines believing they are faulty. If you buy a computer that says its a Spectrum +2 on the box, that looks like a +2 (just a little darker), but wont run your wordprocessor or even some of your game - what would you do? Our source also hinted that they were hoping to obtain stocks of the old +2 soon.

£5m OFF SCHOOL COMPUTERS.

No, its not the sale of the century, its a disaster for our kids education. Spending on information technology in schools has been cut by 5.5 million (from £14 to £8.5 million).

MICROPROSE BUYS TELCOMSOFT.

Microprose is reported to have paid around £2 million for the software division of British Telecom. The deal includes the entire operation, from budget label SILVERBIRD to top of the range RAINBIRD. It is unclear where the company will now base the Telecomsoft operation.

HACKING ACTION.

Emma Nicholson MP lost in her bid to make computer hacking (gaining entry to computer systems without permission) a criminal offence. Her bill failed due to lack of time. But the government have promised to look at taking action later this year.

LOW COST 24 PIN PRINTER

Citizen have anounced a new 24 pin dot-matrix printer for under £400 and called the SWIFT 24. Four different fonts included as standard (with extra available as plug in cards) the printer has a claimed speed of 160 characters per second in draft or 53cps in letter quality. Like many quality printers these days it includes nice features like Paper-Parking, the easy way to use both sheet and tractor feed paper on the same machine. The printer is compatible with Epson, IBM and NEC P6 standards.

If you have any news items you want to pass on then send them in. Please mark the envelope NEWS in the top corner.

OMNICALC 2 TO DISC

By: Japp Kuiper.

In a previous issue of FORMAT there were some loose remarks regarding OMICALC2. Unfortunately, I'm sorry to say, these were of precious little help. But I hope with this article to provide some real solutions to getting the program working with DISCiPLE & PLUS D disc systems.

Sadly though, the Transform conversion of OMICALC2 for the DISCiPLE / PLUS D, as sold by both Transform and MGT, is a bit of a sob-story. Primarily this is the Opus Discovery version copied to a GDOS format disc. Therefore, it only works for (a single) drive one. In addition there are no CATalogue and no ERASE. Furthermore a new feature has been completely omitted and some vital information has simply been withheld.

Now for the good news. Firstly copy your original tape version of "om2" to disc. There are plenty of good tape to disc copiers around to assist. Do NOT, however, save it to disc as an Autoload file nor as a Snapshot file. Secondly RESET your Spectrun. Thirdly enter the following small program:-

```
10 POKE 4e4,207: POKE 40001,49: POKE
   4002,201
20 RANDOMIZE USR 4e4
30 LOAD d*"OmnicalC2"
   (or whatever name you saved it as)
```

Then save to disc by:-

SAVE d1"AUTOLOAD" LINE 10

You will now find Omnicalc2 to perform as if it were running from Interface One as originally intended. In other words almost entirely as per the original manual. It will happily LOAD, SAVE, VERIFY, CAT, ERASE to and from channels 0, 1 and 2 for tape, drives 1 and 2 respectively. (The latter two on channels 1 and 2 only for obvious reasons). PRINTing Histograms is different in that this only works through SNAPSHOT 1 and 2. Snapshot 3 being an extra bonus.

THE SECRET

When LOADing OMNICALC2 (and a few other programs for that matter) it "looks" for the presence of Interface One by checking the start of the Basic area in RAM. Normally this is at 23755, try this line to prove it:-

PRINT PEEK 23635+256* PEEK 23636

The three bytes of machine code in the new LOADer program raise the start of the Basic area to address 23813. We thus "fool" OMNICALC2 in believing Interface One has been connected and the program from then on acts accordingly, unlocking it's Interface One features.

Since the DISCiPLE and PLUS D are ever so kind in understanding Microdrive Syntax the program now runs and operates entirely as if Interface One were hooked up to our Spectrum.

RESCUE CALLS

Disc drives have a habit of invoking error messages such as Write Protected, Disc Full, Check Disc In Drive (when you forget to close the drive door) and what have you. All these messages drop you into Basic. You can now stop cursing yourself when such an error occurs prior to saving a complicated model. A choice of two special user calls comes to the rescue. Firstly try:-

RANDOMIZE USR 63081

This should successfully throw you back into OMICALC2. Depending on the type of error message generated, no 100% guarantee, however, is given and you therefore should check for any corruptions. I have myself forced some errors and found no damage was done to my model. An additional recovery path is by:-

RANDOMIZE USR 57131
followed by G(oto) a1.

All the above mentioned hints and tips will also hold for the Transform disc version of OMNICALC2. Owners of such a disc should type in the line:-

ERASE d*"Autoload" TO"OMNI2"

and then proceed as outlined above. They can also ignore the Opus addendum sheet and go by the book as far as normal operations are concerned. The one and only good thing about the Transform version is that the initial waiting has been taken out of the program. It now does not perform a long search for the presence of Interface One anymore but simply assumes its there and liberates CAT and ERASE for our perusal.

FUNCTION Z

The added function Z is a bit of a joke. Option P for printer control is the only valuable addition. It allows us to switch from within OMNICALC2 between PICA, ELITE, CONDENSED MODE etc. This is a very useful addition when we want to print large models with many columns. Microsphere, the original designers of OMNICALC sells (or at least used to sell) a very clever converter program.

By checking the Transform disc against this program I found Transform used this very conversion method to produce their DISCiPLE / PLUS D version of OMNICALC2. As previously mentioned they did a sorry job.

If you have an original OMNICALC tape you will do yourself a favour in obtaining the original conversion tape. This will set you back about a fiver.

The conversion program allows you to custom design your very own Function Z. My implemention of a decent Function Z goes as follows:-

```
 1 CLS: PRINT AT 10,3;"REMEMBER TO S
   AVE DATA/WORK": PAUSE 0: IF INKEY
   $<> CHR$ 7 THEN RANDOMIZE USR 0
 2 LOAD d1"formprint"CODE 23296;RAND
   OMIZE USR 23296
 3 LET c=z etc.
10 REM Exit/Formulae/Print
```

OMNICALC2 lacks a decent way to quit. The INKEY$<>CHR$7 bit will allow you to correct a fatal error by pressing the EDIT key as used throughout this program. Nothing wrong of course in replacing the USR 0 with LOAD d1"Tasword" and add a further line of Basic along the same lines to go into Masterfile. Software Integration at its best.

Since you can have up to 10 lines of Basic there is plenty of scope. Line 3 contains the printer control. Little point in quoting this particular line here in full, since it is fully outlined in the instruction sheet which accompanies the converter tape. If you do decide to add Tasword and Masterfile in lines 4 and 5 line 10 will look like:-

```
10 REM Exit/Formulae/Print/Tasword/M
   asterfile.
```

FORMULAE

On the tape is also an extremely useful block of machine code which will print the formulae which you used in your model. It will happily live in the printer buffer so no need to use the reduced version - om64000 - of OMNICALC2. Simply copy this block of machine code to disc and include the above mentioned line 2 of Basic to invoke it from within OMNICALC2 through function Z, option F.

SNAG

Nothing is perfect and neither is OMNICALC2. The program, although

Turn to page 30.

SHORT • SPOT

By: John Wase.

Roy Slade of Barnstaple writes that he has a quick routine to explain the funny money abroad - he refers to the daily newspaper just before he leaves, inserts the conversion rate, and does half a dozen screen dumps with the snapshot button (some to give away). He encloses lots of examples - here are just two:-

Example 1

```
 5 POKE @5,40
10 INPUT "Enter Conversion Rate";r
30 LET z=r
40 PRINT INVERSE 1;" Conversion Rate
   ";z;" "
50 PRINT "Francs £"
60 DEF FN b(y)=(INT (100*(y/z)+0.5))
   / 100
70 FOR k=5 TO 100 STEP 5
80 PRINT TAB 3-LEN STR$ INT k;k,TAB
   1 8-LEN STR$ INT FN b(k);FN b(k)
90 NEXT k 100 PRINT AT 11,7;"FRANCE"
```

Example 2

```
 5 POKE @5,40
10 INPUT "Enter Conversion Rate";r
30 LET z=r
40 PRINT INVERSE 1;" Conversion Rate
   ";z;" "
50 PRINT "Lire £"
60 DEF FN b(y)=(INT (100*(y/z)+0.5))
   /100
70 FOR k=1000 TO 20000 STEP 1000
80 PRINT TAB 5-LEN STR$ INT k;k,TAB
   1 9-LEN STR$ INT FN b(k);FN b(k)
90 NEXT k 100 PRINT AT 11,7;"ITALY"
```

Ian Spencer of West Germany writes about Word 'Master. Like me, he's not particularly taken with some of the letter shapes displayed on-screen, for example "M" or "W", so he's altered them as follows: he says that his are easier to read. Do CLEAR 30000, then load WM. Now get into Basic and write a small program to poke the character set as follows (8 bytes per character)

Char	Address	Values
%	64552	0,0,68,85,34,85,17,0
*	64592	0,0,85,34,119,34,85,0
4	64672	0,17,51,85,85,119,17,0
K	64856	0,85,85,102,102,85,85,0
M	64872	0,85,119,119,119,85,85,0
N	64880	0,119,85,85,85,85,85,0
V	64944	0,85,85,85,85,85,34,0
W	64952	0,85,85,119,119,119,34,0
a	65032	0,0,119,17,119,85,119,0
l	65120	0,102,34,34,34,34,119,0
m	65128	0,0,85,119,119,85,85,0
q	65160	0,0,119,85,119,17,17,0
v	65200	0,0,85,85,85,85,34,0
w	65208	0,0,85,85,119,119,85,0

Note:- The letter starting at 65120 is the lower-case L.

And finally end with SAVE "WM" CODE 54174,11362. Ian mentions that of course, letters like "M" and "W" are still a compromise, but that he finds that this gives a considerable improvement in readability.

I was intrigued by Mr J.J.Farrel's letter, which came down from the Wirral with some jottings for a program called "The bluebottle that should have stayed at home". Regrettably, with a lovely name like that, I couldn't get it to work properly - could he please forward a tape or disc with a working copy?

L.G.Baumann of Cowie's Hill, South Africa, writes about INKEY$. The advantage of this function is that you can get an immediate response without having to press "Enter": the disadvantage is that only numbers from

0 to 9 are available. However, the use of two digits is possible with the following routine:-

```
 10 FOR N=1 TO 9: PRINT "0";N: NEXT N
 20 FOR N=10 TO 22: PRINT N: NEXT N
 21 PRINT AT 21,10;"Choose No.? ";
 30 PAUSE 0: LET M$=INKEY$: BEEP .2,2
    0: PRINT AT 21,25;M$
 40 PAUSE 0: LET N$=INKEY$: BEEP .2,2
    0: PRINT AT 21,25;N$
 50 LET M$=M$+N$
 60 IF VAL M$<1 OR VAL M$>22 THEN GOT
    O 30
9999 CLS: PRINT "Objective accomplishe
     d - No.";M$
```

Next, Robin Hughes of Ebbw Vale encloses this neat little routine. How do you buy discs? Normally you buy at least ten (they're dear then) or even fifty or a hundred at bulk rate. The first thing you have to do is format them and usually you want the system code on, too, so here's his bulk format program.

```
  0 REM "FORMAT" v1.1 ROBIN HUGHES 19
    89
 10 CLS #: PLOT 38,64, DRAW 0,40: DRA
    W 180,0: DRAW 0,-40: DRAW -180,0
 20 PRINT AT 10,6; FLASH 1;"WARNING T
    HIS PROGRAM": PRINT AT 12,8; FLAS
    H 1; "WILL ERASE DISC"
 30 GOSUB 2000
 40 PAPER 1: BORDER 1: INK 7
 50 CLS : PRINT AT 10,8; FLASH 1;"FOR
     MATTING DISC"
 60 FORMAT D*
 70 CLS : PRINT AT 10,9; FLASH 1;"SAV
     ING SYSTEM"
 80 SAVE D*"+SYS"CODE 8192,6656: CAT
    *
 90 PLOT 50,65: DRAW 0,36: DRAW 140,0
    : DRAW 0,-36: DRAW -140,0
100 PRINT AT 10,8;"DISC FORMATTED": P
     RINT AT 12,8; FLASH 1;"LOAD NEXT
     DISC"
110 GOSUB 2000: GOTO 50
2000 PRINT #0;" PRESS ANY KEY TO CONTI
     NUE"
2005 BEEP .1,18: BEEP .1,16: IF INKEY$
     ="" THEN GOTO 2005
2010 RETURN
9999 SAVE D*"FORMAT" LINE 0
```

If you've got a Disciple, then modify line 80 for the Disciple system thus:-

```
80 SAVE D*"SYSTEM" CODE 0,6656: CAT
   *: REM EARLY DISCIPLES USED CODE
   0,6144
```

Finally, I am grateful to Trevor Wright of Melton Mowbray for his little booklet of bits and pieces. One point mentioned is the use of the system variables in programming. So if you have a program which displays, say a program name on screen before saving it to disc from backup tape, the last thing you want is for the whole shooting match to stop with the message "Scroll?". Poking 23692 with 255 will give you 256 scrolls - set it up as a loop in the program if you want more than that.

Another similar idea is to set Caps Lock on automatically from within the program before asking for information; say with INKEY$. Saves testing both for caps and lower case input. For example "PRINT "FORMAT DISC (Y/N)?": POKE 23617,8: IF INKEY$ ="....."

As a tailpiece, here is an adaptation of one of his snippets. If you were to go into your local computer shop (you must not, of course, do this) and enter the following into one of their display Spectrums:- PRINT "INDUG IS THE BEST USER GROUP": RANDOMIZE USR 1000 the border would turn black (Speccy's dying!) and the keyboard would lock solid, so there it would all stay until they reset or pulled the plug. As an alternative, you could, of course do "John Wase is the greatest!".

Now please; I know it's the holiday season soon, but please keep the contributions rolling in. Send your items direct to me at:-

John Wase.
Green Leys Cottage,
Bishampton,
Pershore,
Worcs,
WR10 2LX.

See you next month.

T.V. TEST CARDS

On Your Spectrum.

By: Dick Guy.

This program was written to assist in setting up televisions after repair, however it you will find it very useful for fine-tuning your T.V. so as to get the best picture from your Speccy (a computer not renowned for the quality of its T.V. output).

When you RUN the program you will be given a menu of five different options.

1 TEST CARD 1
2 TEST CARD 2
3 COLOUR TUNING CHART
4 LINEARITY TEST
5 OVERALL COLOUR TEST

Just press a numeric key to select an option.

Anyone familiar with T.V. testing will be right at home, but for those of you who are not here are a few brief hints.

Options 1 & 2 give test cards that are used for fine-tuning your picture, switch between them if you need to. They are based on test cards used by many television stations around the world.

Option 3 is a colour bar generator with alternate lines set with bright on.

With option 4 lines are drawn to enable you to set screen linearity. The aim is to ensure that lines are straight and the same distance apart. Not an easy job, so if your set is way out it may be best to have it looked at by an expert.

Option 5 sets the whole screen to each colour in turn, just press a key to change to the next colour. This option can be used to check for many faults on a T.V. look for changes of colour in the corners or centre of the screen.

The program is simple to type in, graphics are show by their key presses enclosed in {}. So {GS 5} means - enter Graphics Mode - press Shift and 5 - for more details see EASY READ in FORMAT Vol 1 No 10.

```
  1 REM ** T.V. TEST CARD PROGRAM **
  2 REM ** (c)1989 FORMAT **
  3 REM ** Written By Dick Guy. **
  4 :
 10 GOSUB 7000
 20 CLS #
 30 PRINT AT 0,8; INVERSE 1;"T.V. TES
    T CARDS"
 40 LET T$="    "
 50 PRINT ''T$;"1  TEST CARD 1"
 60 PRINT 'T$;"2  TEST CARD 2"
 70 PRINT 'T$;"3  COLOUR TUNING CHART
    "
 80 PRINT 'T$;"4  LINEARITY TEST"
 90 PRINT 'T$;"5  OVERALL COLOUR TEST
    "
100 PRINT AT 20,6; FLASH 1;"SELECT CH
    ART TO USE"
110 LET I$=INKEY$: IF I$="" THEN GOTO
     110
120 IF I$<"1" OR I$>"5" THEN BEEP .5,
    -15: GOTO 110
130 GOSUB 1000*VAL I$
140 RUN
150 STOP
1000 REM ** TEST CARD 1. **
1010 LET A$="{GS 5}RTG #1{G 5}"
1020 CLS #: BRIGHT 1
1030 REM GRID LINES
1040 FOR n=0 TO 255 STEP 16: PLOT N,0:
     DRAW 0,175: NEXT N
1050 FOR n=0 TO 175 STEP 8: PLOT 0,N:
     DRAW 255,0: NEXT N
1060 REM TOP CASTLELATIONS
1070 PRINT  PAPER 7;S$; PAPER 0;S$; PA
```

```
    PER 5;S$; PAPER 0;S$; PAPER 5;S$;
     PAPER 0;S$; PAPER 5;S$; PAPER 0;
    D$; PAPER 5;S$; PAPER 0;S$; PAPER
     5;S$; PAPER 0;S$; PAPER 5;S$; PA
    PER 0;S$; PAPER 7;S$:
1080 REM BOTTOM CASTELELATIONS
1090 PRINT AT 21,0; PAPER 7;S$; PAPER
    0;S$; PAPER 4;S$; PAPER 0;S$; PAP
    ER 4;S$; PAPER 0;S$; PAPER 4;S$;
    PAPER 0;D$; PAPER 4;S$; PAPER 0;S
    $; PAPER 4;S$; PAPER 0;S$; PAPER
    4;S$; PAPER 0;S$; PAPER 7;S$
1100 REM SIDES
1110 FOR n=0 TO 19 STEP 2
1120 PRINT AT n+1,0; PAPER 6;S$;AT n+1
    ,30; PAPER 6;S$;AT n+2,0; PAPER 0
    ;S$;AT n+2,30; PAPER 0;S$: NEXT N
1130 REM MID VERT BLANKS
1140 FOR n=10 TO 11
1150 PRINT AT n,0; PAPER 0;S$;AT n,30;
     PAPER 0;S$: NEXT N
1160 PRINT AT 17,12; PAPER 1;G$;AT 18,
    12; PAPER 1;G$;AT 19,12; PAPER 1;
    G$
1170 REM IDENT
1180 PRINT AT 18,12; INK 1;"{GS 5}"; I
    NK 0;"RTG #1"; INK 1;"{G 5}"
1190 REM SAME
1200 PRINT AT 4,4;;F$;AT 4,11; PAPER 0
    ;H$;AT 4,21; PAPER 7;F$
1210 PRINT AT 5,4;F$;AT 5,11; PAPER 0;
    H$;AT 5,21; PAPER 7;F$
1220 PRINT AT 6,4;F$;AT 6,11; PAPER 0;
    H$;AT 6,21; PAPER 7;F$
1230 PRINT AT 7,4;L$+S$+B$; PAPER 0;S$
1240 PRINT AT 8,4;L$+S$+B$; PAPER 0;S$
1250 REM COLOURS
1260 FOR N=9 TO 11: BRIGHT 1: PRINT AT
     N,4; PAPER 6;D$; PAPER 5;D$; PAP
    ER 4;D$; PAPER 3;D$; PAPER 2;D$;
    PAPER 1;D$: NEXT N
1270 PLOT 31,104: DRAW 190,0
1280 PLOT 32,79: DRAW 191,0
1290 PLOT 32,105: DRAW 0,38
1300 REM NEXT 3 LINES ARE 6*GRAPHICS C
    ,5*GRAPHICS B,7*GRAPHICS A,6*GRAP
    HICS D
1310 BRIGHT 0
1320 PRINT AT 14,4;"{G C}{G C}{G C}{G
    C}{G C}{G C}"
1330 PRINT AT 15,4;"{G B}{G B}{G B}{G
    B}{G B}{G B}"
1340 PRINT AT 16,4;"{G A}{G A}{G A}{G
    A}{G A}{G A}"
1350 PRINT AT 14,22;"{G F}{G F}{G F}{G
     F}{G F}{G F}"
1360 PRINT AT 15,22;"{G E}{G E}{G E}{G
     E}{G E}{G E}"
1370 PRINT AT 16,22;"{G D}{G D}{G D}{G
     D}{G D}{G D}"
1380 PRINT AT 13,14;"{G G}{G G}{G G}{G
     G}"
1390 PRINT AT 14,14;"{G G}{G G}{G G}{G
     G}"
1400 PLOT 33,40: DRAW 190,0
1410 PLOT 112,72: DRAW 0,-16: DRAW 32,
    0
1420 PLOT 176,40: DRAW 0,24
1430 GOSUB 6000
1440 RETURN
2000 REM ** TEST CARD 2. **
2010 CLS #
2020 LET A$="{GS 5}RTG #2{G 5}"
2030 BRIGHT 1
2040 FOR i=0 TO 240 STEP 16
2050 PLOT i,0
2060 DRAW 0,175
2070 NEXT i
2080 FOR i=0 TO 175 STEP 16
2090 PLOT 0,i
2100 DRAW 255,0
2110 NEXT i
2120 PLOT 0,175
2130 DRAW 255,0
2140 DRAW 0,-175
2150 CIRCLE 127,80,64
2160 PRINT AT 10,10;"SPECTRUM T.V."
2170 PRINT AT 12,11;"Channel 36"
2180 FOR c=0 TO 7
2190 INK c
2200 PRINT AT 3+2*c,2;"{GS 8}"
2210 PRINT AT 4+2*c,2;"{GS 8}"
2220 PRINT AT 3+2*c,28;"{GS 8}"
2230 PRINT AT 4+2*c,28;"{GS 8}"
2240 NEXT c
2250 PRINT AT 15,12; PAPER 1;G$;AT 16,
    12; PAPER 1;G$;AT 17,12; PAPER 1;
    G$
2260 PRINT AT 16,12; INK 1;"{GS 5}"; I
    NK 0;"RTG #2"; INK 1;"{G 5}"
2270 INK 0
2280 GOSUB 6000
2290 RETURN
3000 REM ** COLOUR TUNING CHART **
3010 CLS #
3020 FOR K=0 TO 10: FOR J=0 TO 1: FOR
    I=0 TO 7: PRINT  BRIGHT J; PAPER
    I;"    ";: NEXT I: NEXT J: NEXT K
3030 REM  PRINT #0;"       COLOUR TUNIN
    G CHART"
3040 PRINT AT 10,6; BRIGHT 1;"COLOUR T
    UNING CHART"
3050 GOSUB 6000
3060 RETURN
4000 REM ** LINEARITY SQUARES **
4010 CLS #
```

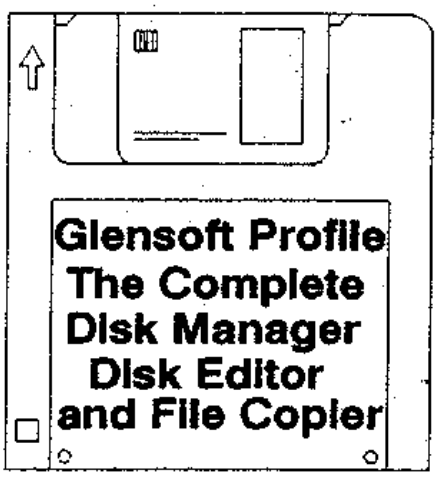
```
4020 FOR I=0 TO 85 STEP 5
4030 PLOT I,I
4040 DRAW 255-(I+I),0
4050 DRAW 0,175-(I+I)
4060 DRAW -255+(I+I),0
4070 DRAW 0,-175+(I+I)
4080 NEXT I
4090 PLOT 0,0: DRAW 85,85
4100 PLOT 255,0: DRAW -85,85
4110 PLOT 255,175: DRAW -85,-85
4120 PLOT 0,175: DRAW 85,-85
4130 PRINT AT 19,9; BRIGHT 1;"LINEARIT
     Y TEST"
4140 GOSUB 6000
4150 RETURN
5000 REM ** FULL SCREEN COLOUR **
5010 CLS #
5020 FOR I=0 TO 7: FOR J=0 TO 1
5030 BRIGHT J: PAPER I: BORDER I: CLS
5040 PRINT AT 9,7; INK 9;"OVERALL COLO
     UR = ";I
5050 PRINT AT 11,10; INK 9;"BRIGHT = "
     ;("ON" AND J);("OFF" AND NOT J)
5060 GOSUB 6000
5070 NEXT J: NEXT I
5080 RETURN
6000 PRINT #0;"Press any key..."
6010 PAUSE 1: PAUSE 0
6020 LET I$=INKEY$
6030 RETURN
7000 REM GRAPHICS A-G
7010 IF PEEK (USR "A")=170 THEN GOTO 7
     110
7020 FOR I=1 TO 7
7030 READ A: FOR J=0 TO 7: READ N: POK
     E USR CHR$ A+J,N: NEXT J: NEXT I
7040 DATA 144,170,N,N,N,N,N,N,N
7050 DATA 145,204,N,N,N,N,N,N,N
7060 DATA 146,231,N,N,N,N,N,N,N
7070 DATA 147,0,255,0,255,0,255,0,255
7080 DATA 148,0,0,255,255,0,0,255,255
7090 DATA 149,0,255,255,255,0,255,255,
     255
7100 DATA 150,170,85,170,85,170,85,170
     ,85
7110 LET S$="  ": REM 2 spaces
7120 LET D$="    ": REM 4
7130 LET F$="       ": REM 7
7140 LET G$="        ": REM 8
7150 LET H$="          ": REM 11
7160 LET Q$=CHR$ 143+CHR$ 143+S$
7170 LET L$=Q$+Q$+Q$: LET B$=Q$+Q$
7180 RETURN
9999 SAVE d1"TV TEST" LINE 10
```

I hope you find the program useful, rest assured its much cheaper than buying a proper test-card generator.

GLENSOFT PROFILE

The Disk Editor allows the viewing and editing of sectors. It is powerful with many features as found on machines like P.C.'s etc

File Copier allows transfer of any file (Including Open Type, Snapshots, MDrive, etc) to another drive and also across the network for Disciple Owners.



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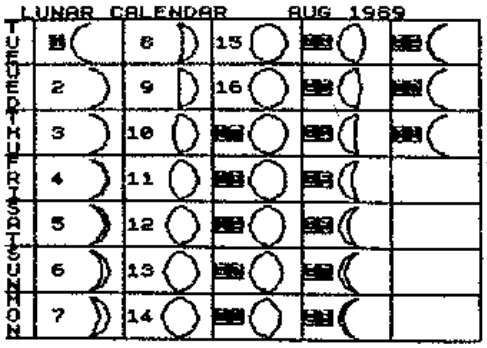

LUNAR CALENDAR

By: Jason McNeal.

The Moon has always held a fascination for mankind, since the dawn of time it has been the largest object visable in the night sky. As man struggled along the road to civilization he has often turned to the Moon and worshipped it as a god. Early man tried to understand and explain the waxing and waning process the Moon goes through every 29 days. Were the other gods eating away at the Moon? Remember that Stonehenge was built (over a period of generations) to predict Lunar and Solar eclipses, this proves the importance of the Lunar Calendarr to our ancestors.

Well we now understand the phases of the Moon, the mystery is gone, and now even you Spectrum can produce a Lunar Calendarr for you. The program will run an any Spectrum but it will need a printer to get the maximum benifits.

To simplify the calculations the calendarr can only be produced for months in the years 1950 to 2050. The example given (top of page) is for August 1989. From this you will note that the phases between the 2nd and 16th of the month have their dates printed normally, this showes the Moon is WAXING - moving from NEW to FULL. The other dates are shown INVERSE to indicate that the Moon is WANING - going from FULL to NEW. The actual NEW and FULL Moons occur at the change over.

```
 1 REM **********************
 2 REM *LUNAR PHASE CALENDAR*
 3 REM *  By Jason McNeal.  *
 4 REM **********************
 5 REM
10 BORDER 5: PAPER 5: INK 0: CLS
20 POKE 23658,8
30 INPUT "YEAR (1950-2050) ";Y''"MONTH
    No (1-12)  ";M
40 IF Y<1950 OR Y>2050 OR M<1 OR M>12
    THEN GOTO 50
50 PRINT " LUNAR CALENDAR    ";"JANFE
   BMARAPRMAYJUNJULAUGSEPOCTNOVDEC"(M
   *3-2 TO M*3);" ";Y
60 FOR I=0 TO 180 STEP 24: PLOT 0,I:
   DRAW 255,0: NEXT I
70 FOR I=0 TO 5: PLOT I*48+15,0: DRAW
    0,168: NEXT I
80 LET M$="202121221212"
90 LET D$="SATSUNMONTUEWEDTHUFRI"
100 LET END=29+VAL M$(M)-(1 AND M=2 AN
   D Y/4<>INT (Y/4))
110 LET J=INT (365.25*(Y-(M<3)))+INT (
   30.6001*(M+1+12*(M<3)))-INT (Y/100
   )+INT (Y/400)
120 LET WD=(J-7*INT (J/7)+1)*3
130 LET D$=D$(WD+1 TO )+D$( TO WD)
140 FOR I=1 TO 21: PRINT  OVER 1;AT I,
   0;D$(I): NEXT I
150 LET XP=40: LET YP=20
160 FOR D=1 TO END
170 LET A=10: LET MD=29.73
180 LET N=VAL "02022446789A"(M)
190 LET PH=(Y-1930)*11-150+N+D-1
200 LET PM=PH/MD
210 LET PH=(PM-INT PM)*MD
220 LET P=PI: LET F=0
230 IF PH>MD/2 THEN LET P=-P: LET F=1
240 PRINT AT YP/8-1,XP/8-3;(" " AND D<
   10); INVERSE F;D
250 LET C=PH-MD/4: IF C>MD/4 THEN LET
   C=C-MD/2
260 PLOT XP+5,165-YP: DRAW 0,20,P
270 DRAW 0,-20,2.5*ATN ((PI/180)*C*25)
280 LET YP=YP+24: IF YP>170 THEN LET Y
   P=20:.LET XP=XP+48
290 NEXT D
300 REM * insert screen copy routine h
   ere if you want.
```

Now, if you want to plan that Moonlight walk along the shore with the love of your life, you can at least arrange a date when the Moon is big and bright (provided the clouds don't get in the way that is).

THE HELP PAGE

Problems with your DISCiPLE, PLUS D or Spectrum. Dont worry, let the HELP PAGE sort them out. Note: One question per letter please.

By: Nev Young.

P Clough of Durham writes and asks "Is it possible to drive a laser printer from a Spectrum and a PLUS D".

First I feel I must climb onto an orange box and correct all FORMAT readers on laser printers. The term laser printer is rapidly becoming a misnomer. There are printers that use a laser to produce an image on the paper, but what most people mean when they say laser printer is 'page printer'. These work on a number of different technologies. Some use lasers (and generally CFCs), others use magnetic inking but most use xerography. All have one thing in common and that is an entire page of data is sent to the printer before anything is printed. Therefore the correct name is page printer.

Now to use a page printer with the Spectrum via a PLUS D can be done but there are a few points to watch out for, and considering that a page printer will cost at least £1150.00 they must be considered very carefully. The first is the interface, there are mainly two types serial (RS232) and parallel, you need parallel and centronics parallel at that. Secondly there are postscript printers and there are non postscript printers. You definitely do NOT want a postscript printer with the PLUS D. Can you afford 1.2 - 5 pence per page printing. Then you have all the same problems you would have when buying any other printer such as: Is it EPSON compatible. If not can the Spectrum supply the correct control codes. What fonts does it have. What character sets etc etc. I think your biggest problem would be getting EPSON graphics compatability which you would most certainly need to print your fancy letter heading.

J V Ingram of Dunedin New Zealand has a problem with Masterfile in that he can not get a printed copy of the records. Now I am not a fan of Masterfile I find it very difficult to set up and add/change data in the files but the reporting facilities are quite good, although a bit too much like MAPPER for my taste. My own copy of Masterfile is quite old and written for microdrive but it sounds as if you have the same problem as I did when using the DISCiPLE. Masterfile does all it's printing via the basic COPY command. This does not work with the DISCiPLE and PLUS D because of a bug with the 128s ROM. So you have to replace the COPY command in the basic with SAVE SCREEN$ 1. You should now be able to get all the Masterfile print functions to work. As for your other problem about an alternative program that makes better use of the disc then I'm sorry I don't know of any that have reached the market but I am aware of at least two that are being produced. I can only suggest that you keep an eye on the advertisement pages.

J Husband of Cleveland is "amazed at how quickly the ribbon faded." on his DMP2160 printer. You should be annoyed not amazed. If you really want to try re-inking your ribbon then be prepared for a messy time. I have done it quite successfully a few times on my own Mannesman Tally ribbons. You will need a small bottle of endorsing ink, The type used for inking rubber stamp pads, and an old ribbon cassette. You will need to break open the cassette to expose the ribbon. Take care here as if it all falls out you may as well throw it away. Then apply a few drops of ink to the crumpled mass of ribbon inside. Believe me a few drops goes a long way. If you've not got enough on

add more but please do not over do it. If there is too much ink then as the ribbon passes through the print head of the printer it will get squeezed out and make a dreadful mess, when I first did it I had ink all over the printer, the desk and dripping onto the carpet. After a few tries you'll get good at it. I don't suppose I need to tell you to re-assemble the ribbon before trying it.

I have had a number of letters about disc drives and the compatibility between different types. I am reluctant to open this Pandoras box as there are so many different questions and not always the same answer applies to each. I will have to keep this fairly simple so don't be offended if your question is not answered here. Will programs written for the DISCiPLE/PLUS D work on a +3?

If the program only uses the disc to load and save programs/data then yes it will, with the proviso that some lines of the basic will need to be changed. If, however, the program does anything dastardly like reading or writing the directory (eg by using LOAD@ or SAVE@) then NO it will not work. Also if the disc is driven from machine code then it will probably not work, as the machine code interface to the discs is different. This does not mean that a program couldn't be written to the the same task, just that it would not be a few simple changes.

Can you drive an OPUS Discovery from a DISCiPLE? This depends on what you mean by drive. You can connect the DISCiPLE onto the Discovery through connector and with a bit of fiddling with the inhibit button get both to work to enable you to copy stuff from Discovery to DISCiPLE. But if you want to run the Discovery disc drive as a DISCiPLE drive then you have to break open the discovery and disconnect the drive from the internal circuit board. Then connect the disc drive to the DISCiPLE via a standard BBC type ribbon cable, and leave the Discovery disconnected from the Spectrum and DISCiPLE edge connectors. The Discovery power supply would not be used to power the Spectrum just the disc drive.

Why is that whenever I try to format a disc I get the message 'check disk in drive 1' Even with a different Spectrum/PLUS D/disc drive?

This error means that the PLUS D can not find any disc in your disc drive so the things to check are:-

1. Is there a disc in the drive.
2. Is the disc inserted correctly. Remember a 5 1/4 inch disc can be put into a drive 8 ways, only one is right.
3. Is the drive address set up correctly. This one is tricky and requires either a disc manual or a friend who KNOWS what they are doing. The PLUS D is able to run 2 drives and each drive can be addressed 1,2,3 or 4. Your first disc drive must be address 1 and the next address 2. If you have a LED on your drive then you can tell when it is being addressed by the light coming on. So a quick check is connect everything together, switch on, press RUN and ENTER. The light should go out on the PLUS D and the light on drive 1 should come on.

Finally this month E H Cooke-Yarborough of Oxfordshire is having problems with error trapping as described in FORMAT #4. He sent in the following short routine.

```
100 POKE 23728,255
110 CIRCLE 120,50,100
120 POKE 23728,0
130 POKE 23610,255
140 CIRCLE 120,50,40
150 RETURN
```

He points out this should, and indeed does, draw an incomplete circle that goes off the screen followed by a smaller one. But when the RETURN statement is executed the Spectrum hangs. Well Ted you are right about the stack being corrupted by the disciple. When you start your program with GOSUB 100 the last value on the

stack (1303H MAIN-4) is moved down by 3 bytes to store the line and statement number where the gosub was called. In this case statement 1 (02) line -2 (FFFEH a direct command) so the stack will now hold 003EH FEFF02H 0313H . When the command on line 110 is executed a value of 1B76H is put on the stack (stmt-ret) followed by various other values used by the CIRCLE command. There are about 10 bytes of this temporary stack data when the circle goes off the screen and tries to report Integer out of Range. When the disciple traps this and returns to the main rom to execute line 120 it does not clear these extra bytes from the stack.

In this way everything will work OK even if the program is stopped with a STOP or BREAK but if a return is done the top value on the stack is now NOT 0313H followed by the gosub parameters but the temporary data of the unfinished circle. This causes the Spectrum to either crash or hang as it attempts to jump to totally the wrong line. What should have been done is to reload SP with (ERRSP) before jumping to execute the next line. The bug is at about 06EFH in the disciple dos. I'll let somebody else work out the pokes to fix it. While it exists it does mean that using the error trap within a subroutine can be unreliable.

Thats all for this month. Remember If you don't write to me I can't write this column. I also have to point out that I can not answer questions personally so DO NOT send me return postage etc. I will attempt to answer as many queries as possible but only through the magazine. Write to FORMAT or directly to me at:-

FORMAT Help Line,
3, Mitchell Place,
Falkirk,
Stirlingshire,
Scotland, FK1 5PJ.

PCB DESIGNER

FOR THE 48K ZX SPECTRUM

Now you can produce high quality printed circuit boards/circuit diagrams/component layouts on your 48K ZX Spectrum. If you don't own one it's worth getting one just for this suite of programs!

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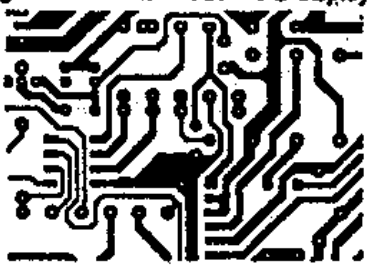
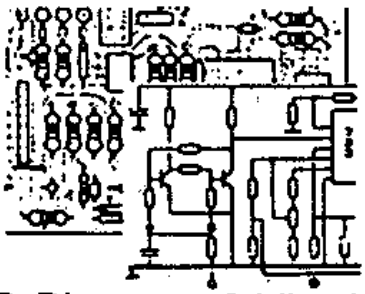


COMPONENT LAYOUT

Draw component layouts directly or from existing pcb layouts using a unique track reducing facility. The following components are provided: resistors, capacitors, ics, diodes, transistors, line drawing, printout and block commands as above. Not available separately.



CIRCUIT DIAGRAMS

Features similar to the above programs with a library of electronic symbols including resistors, capacitors, diodes, transistors, fets, op amp, switches, inductors, logic gates. Not available separately.

State version required from: Disciple/+D; Discovery; +3; Microdrive & Tape. *Important! Tape and Microdrive users please state Centronics interface in use or send £1 for details.*

KEMSOFT THE WOODLANDS, KEMPSEY, WORCESTER WR5 3NB. Tel. 0905 821088 after 6 p.m., or see us on A.I.X-386 BULLETIN BOARD 0905 52536/754127 on any computer with modem.

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Spectrums in the LIBRARY.

PART 2. **By: Carol Brooksbank.**

This month, I want to tell you about the Library's stationery supplies. Any library, however small, needs a variety of different stationery items. We use:-

Borrowers' tickets
Issue forms
Application for membership forms
Book plates
Book reservation forms
Book labels
Book recommendation forms
Overdue book letters
Opening hours & rules lists
Catalogue order forms
Catalogue covers
Notices and posters
Headed notepaper
Withdrawal labels
Petty cash accounts (Filofax format)

Although there are a range of different items, we only need each item in small numbers. For instance, we use one issue form each time the Library is open, to note the book numbers against the members' numbers for books returned and taken out. The information is later transferred to the computer files. Since the Library opens once a month, a year's supply of these forms is just 12 copies.

If we were to have these printed professionally, we should either have to accept an enormous unit cost, or keep stocks which would last us, quite literally, for decades. Either way, it would be a crippling burden on our limited funds, tying up far too much of our capital in printed material.

By using the Spectrum+2, with a PLUS D, 3 1/2" drive and an Epson printer, for printing, we can reduce our main stationery stock to 1 box of 1000 sheets of tractor-feed A4 paper, and one box of 1000 peel-off labels - a capital outlay of £20. All of the layouts for the various items are kept on disc and they can be run off as required. In practice, I tend to run off about a dozen of each item at a time, so we have a stationery printing session once a year.

One-offs like notices and posters are produced as needed. Book plates and labels are printed every time we buy a batch of new books - usually four times a year. Headed notepaper is produced as required - I print the heading on enough sheets for today's letters. Many small businesses would probably want to keep a separate box of headed notepaper, printing the heading on each sheet, but the Library generates very few letters - certainly not enough to justify tying up a full box of paper as headed notepaper.

I use 5 commercial programs for preparing printing screens:-

The Artist II (128K)
The Artist (48K)
The Writer (48K)
Icon Graphix 128 (128K)
Animator 1 (48K)

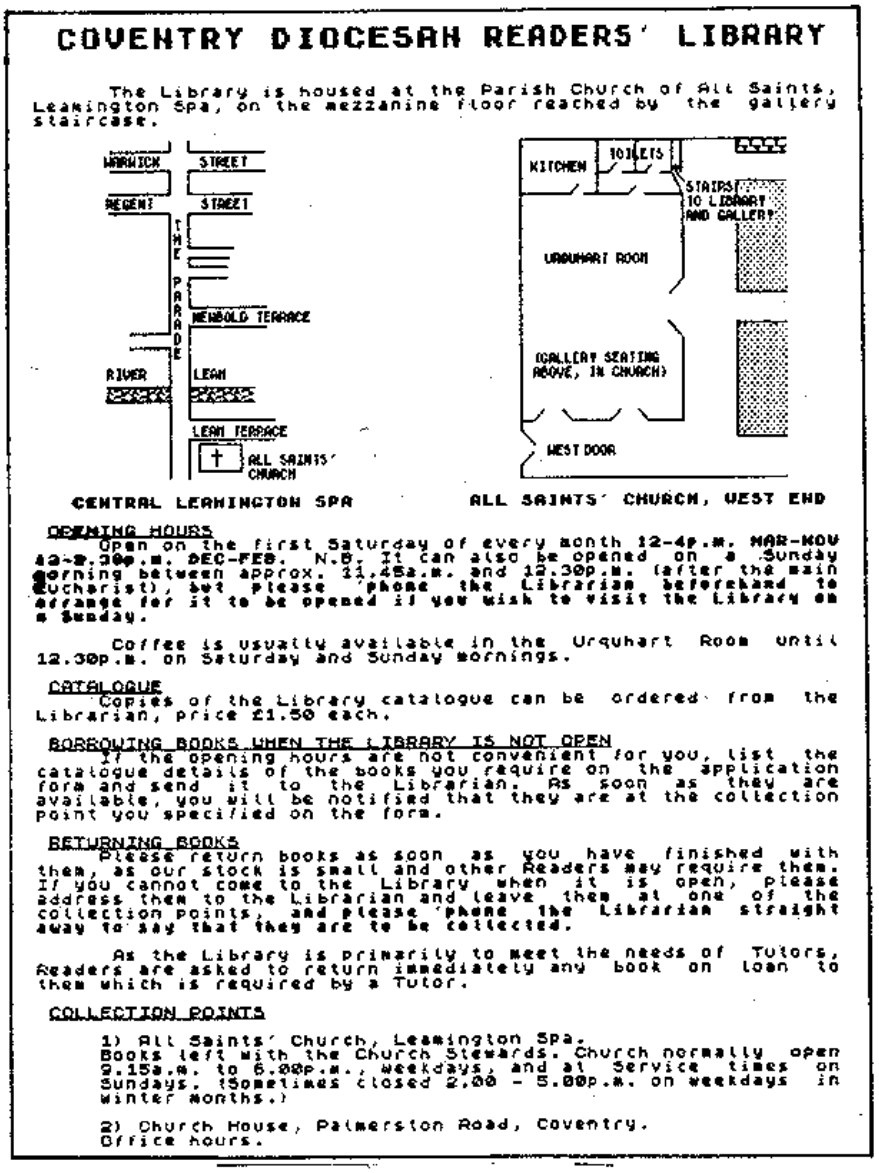
Thanks to the PLUS D disc capacity, I have all of these on one disc, so that I can easily save a part-designed screen and go from program to program to add to it, exploiting the best features of each program.

The principal program is THE ARTIST II. Since most of our forms are to be A4 size, the Pagemaker feature of this program is ideal. It uses eight full screens together to produce an A4 printout, which allows a fair amount of detailed work to be used. In addition, if text is required, it can

be prepared using THE WRITER word processor. Control codes can be inserted to select the Pagemaker typefaces, and spaces left to incorporate illustrations. Fig 1, our rules and regulations, shows a page produced using text and diagrams.

Smaller items, such as book recommendation slips, can be produced four to a sheet of A4, by designing just two screens and inserting each into the Pagemaker four times. Our borrowers' tickets (Fig 2) and applications for membership are smaller still (1 screen each) and printed eight to the page.

Although it has officially been replaced by THE ARTIST II, I still find THE ARTIST useful because it is the only one of the programs which offers an arc between two points, with a variable depth of curve. Fig 3 shows just a few of the arcs available between two points, and some effects obtainable with curves.



COVENTRY DIOCESAN READERS' LIBRARY

The Library is housed at the Parish Church of All Saints, Leamington Spa, on the mezzanine floor reached by the gallery staircase.

OPENING HOURS

Open on the first Saturday of every month 12-4p.m. MAR-NOV 12-2.30p.m. DEC-FEB. N.B. It can also be opened on a Sunday morning between approx. 11.45a.m. and 12.30p.m. (after the main Eucharist), but please phone the Librarian beforehand to arrange for it to be opened if you wish to visit the Library on a Sunday.

Coffee is usually available in the Urquhart Room until 12.30p.m. on Saturday and Sunday mornings.

CATALOGUE

Copies of the Library catalogue can be ordered from the Librarian, price £1.50 each.

BORROWING BOOKS WHEN THE LIBRARY IS NOT OPEN

If the opening hours are not convenient for you, list the catalogue details of the books you require on the application form and send it to the Librarian. As soon as they are available, you will be notified that they are at the collection point you specified on the form.

RETURNING BOOKS

Please return books as soon as you have finished with them, as our stock is small and other Readers may require them. If you cannot come to the Library when it is open, please address them to the Librarian and leave them at one of the collection points, and please phone the Librarian straight away to say that they are to be collected.

As the Library is primarily to meet the needs of Tutors, Readers are asked to return immediately any book on loan to them which is required by a Tutor.

COLLECTION POINTS

1) All Saints' Church, Leamington Spa.
Books left with the Church Stewards. Church normally open 9.15a.m. to 6.00p.m., weekdays, and at Service times on Sundays. (Sometimes closed 2.00 - 5.00p.m. on weekdays in Winter months.)

2) Church House, Palmerston Road, Coventry.
Office hours.

Fig 1.

ANIMATOR 1 is very good at manipulating type faces. I have discovered that by slightly changing the ARTIST II typeface code blocks and re-saving them, they can be loaded into ANIMATOR 1, and enlarged, mirrored, and so on very easily.

ICON GRAPHIX must be the slowest graphics program on the market. Its cursor creeps about at snail's pace and the fill speed is ridiculous, but the program does have its own strengths. It has a particularly good range of large type faces (Fig 4). They cannot be loaded into the other programs, but they are invaluable for posters and notices. Also, it has a better range of fill patterns than either of the other programs, and since all our printing is in black and white, textures become very important. Its 'rubber stamp' option (a version of cut-and-paste) is easier to use than a similar option in ARTIST II.

Although the final form of our printed items is almost always an ARTIST II Pagemaker page, I rarely print from within the program. I have extracted the printing code from the program and added some BASIC of my own, to give a multiple copy printing program, because it is far too tedious to select the 'Pagemaker' and then the 'Print Page' option for every copy.

We cannot print satisfactorily on card. My printer will only handle very lightweight card - certainly not tough enough to stand up to being a borrowers' ticket or a catalogue cover. So these items are printed onto

A4 paper, and then copied onto card at the local photocopy shop. This is the only 'professional' printing we use, and since we only need very small numbers at a time the cost is not prohibitive. The price of 2 pieces of A4 card for catalogue covers, with a photocopy on the front one, was 24p.

COVENTRY DIOCESAN READERS' LIBRARY

NAME.....

YOUR LIBRARY MEMBERSHIP NUMBER IS

IT WOULD BE VERY HELPFUL IF YOU WOULD QUOTE IT IN ALL TRANSACTIONS WITH THE LIBRARY

Fig 2.

Peel-off labels are used for book plates and labels, and withdrawal labels. The book plate carries our logo - the Diocesan arms and a Readers' badge, and goes inside the book cover to show that we own it. The label goes on the title page, and is used to insert the book number and the classification numbers. If a book is no longer required and is withdrawn from stock, a withdrawal label is used to cancel the book plate.

All these are printed using my own 'Small is beautiful' program which appeared in the December 1988 Format, and which also carried an illustration of one of our book plates.

The Library simply could not function efficiently without the Spectrum. If we did not have an easily produced printed catalogue, our limited opening hours would make it useless to borrowers. If we did not keep the issue records on computer, there would have to be 'one ticket per book', and a limit to the number of books anyone could take out at a time. And no-one would be able to ring me up at home to check whether a book is 'in or out' before they travel half-way across the county in the hope of borrowing it. If we did not do our own printing we could not buy nearly as many books as we do, as all our money would be tied up in stationery.

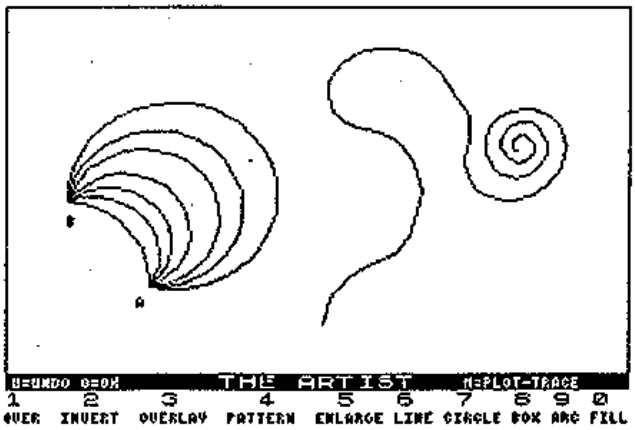


Fig 3.

I feel certain that many clubs, churches and small businesses would be able to use the Spectrum in a similar way to increase their efficiency and reduce their overheads. The computer stores will sneer, and tell you that the Spectrum is a kids' games machine, that you need a PC for serious work. Don't listen to them. A Spectrum, PLUS D, and disc drive with a decent dot matrix printer (not daisy wheel if you want to do printing via screen dumps) will cost no more, and probably a good deal less, than the cheapest so-called 'real' computer, and the savings on software costs are huge.

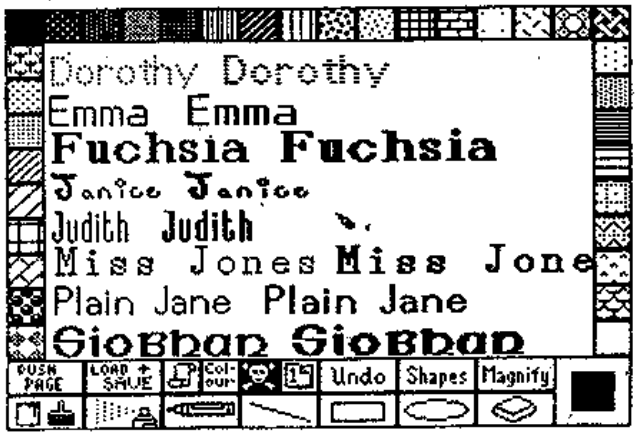


Fig 4.

If you thought that computerising your business was too expensive or too complicated, take a look at the Spectrum and think again.

THE SAM SPOT

By: Bob Brenchley.

The first batch of Bruce's Mega Chips arrived in the UK during the second week in July. The BMC chip is the large custom array which reduces the chip count in the SAM COUPE to just eight (Z80B CPU, 32K ROM, SAA1099 Sound Chip, TEA2000 Video Encoder, 2 off 256x4 Kilo-Bit RAM chips, MIDI coupler, and Bruce's Mega Chip). These first samples of the BMC, together with more arriving at the end of July, will be used to build development machines so that hardware and software development can move into top gear. The list of software companies who want to work with SAM grows longer every week.

Work on the manuals for the SAM COUPE has now started. A team headed by that well known personality - Mel Croucher - is working on the User manual. Kate Cameron-Daum will be doing the desk-top publishing using a MAC/Linotron combination. Mel (famous for his PI-Man cartoon that used to grace the back-page of Popular Computing Weekly and for his topical columns in several magazine) will be writing the manual which will be enhanced by the innovative use of cartoons created by Robin Evans.

A technical manual, written by Bruce Gordon, is also under way, early drafts have already been sent out to some developers.

Next, very good news for all you computer artists out there. MGT have commissioned top Swedish programmer Bo Jangeborg (pictured above) to produce a full feature art package for the SAM COUPE. Bo is well known in the Spectrum arena for his exellent programms ARTIST and ARTIST II. It was originally felt that the package should be made available to help software companies develop graphics for SAM's enhanced screen modes. But, being the generous people that MGT are, and seeking to establish the SAM COUPE in graphic circles (no pun intended) right from the start, MGT have decided to bundle the program with all SAMs from launch.

Finally, a reminder that MGT have the SAM HOTLINE on 0792-791275, a 24 hour recorded news service - updated weekly.

HACK-ZONE

By: Hugh J. McLenaghan.

Hello and welcome to another Hack-Zone. This month I will start off by giving you a list of pokes for Operation Wolf 128K followed by an explanation of how I found these pokes. This should also help you find your own pokes to games. If you have found pokes for any programs then please send them in and I will try to print them in a future Hack-Zone.

Operation Wolf 128K Pokes

40756,183	Inf Grenades
40727,183	Inf Magazines
40722,0	Inf Bullets
40837,0:40838,0	Inf Continues
41150,183:41762,0	Inf Energy
40844,195	) Continue
40845,184	) without timer
40846,120	) appearing

Now for how it was done. I used a PLUS D with PLUS D Hacker by Steve Nutting, this software was reviewed last month. DISCiPLE users can use a Multiface to enter the pokes. Please note that anything following the [sign are my own comments.

First of all I loaded PLUS D Hacker followed by Operation Wolf 128K. When the opening menu came up I pressed the snapshot button followed by number 0 to start up PDH. After a few seconds the menu appeared. The first thing I then did was to press P for pokes, this told me that the return address JP was 31348. I wrote this down and pressed M for menu followed by D for disassemble. For the page number I typed 16 and then N for printer. After typing in the address 31348 the following came up:-

```
31348   LD A,247
31350   IN A,(254)
31352   AND 31
31354   LD HL,31581 [Base address of
                     keyscan tables
31357   LD DE,12    [Length of each
                     keyscan table
31360   LD BC,254
31363   CP 15
31365   JR Z,31432  [Key '5' pressed
31367   CP 30
31369   JR Z,31395  [Key '1' pressed
31371   ADD HL,DE   [Move on to next
                     keyscan table
31372   CP 29
31374   JR Z,31395  [Key '2' pressed
etc.
```

The first two commands read in the half row of keys from 1-5, the next line gets rid of the other bits which are of no use. The remaining value is the status of the keys from 1 to 5. Each number corresponds to a bit of the byte, for each key pressed the bit is reset and for each key not pressed the bit is set, this is the opposite of how you would think it should be.

The next three lines set up registers to hold information about keyscan tables, this is so that you can choose any set of playing keys/joysticks.

The first compare is CP 15 this checks for key '5' pressed and keys 1-4 not pressed, this is the REDEFINE KEYS option, the next line jumps to the routine if the compare is true, ie Z is set.

We want a check for a key which will start the game, ie 1-4. The next compare is CP 30 which is a check for key '1', the following line is JR Z,31395 which means jump to 31395 if the compare was true. The routine at 31395-31428 sets up the keyscan table for your choice of keys, but the command at address 31429, which is

JP 30863, gives us our next disassembly point.

```
30863   CALL 43697   [Reset all sound
                     registers
30866   CALL 42351   [Clear the screen
30869   LD HL,39606
30872   LD BC,24
30875   CALL 42357   [Clears 39606 to
                     39606+23
30878   CALL 32577   [Set-up routine
```

This last line is the important line as calls up the routine to set up the variables, disassembling at 32577 gives us:-

```
32577   LD A,32 [Bullets per magazine
32579   LD (41612),A
32582   LD HL,1797
32585   LD (39616),HL
32588   RET
```

This does not look like it sets up the magazines and grenades, but it does. The actual values are in the third line, ie LD HL,1797. This is 33,5,7 in decimal. Next we take the value in the next line, ie 39616 and search for it in the whole program as this is the grenades value store.

To search you must first press M and then S. After you do this it will ask if you want the data to be printed, I usually press N. Next you type 39616 and write down all of the values including page numbers if required. the values given out are:-

```
31216   [No decrement commands after
        39616 command.
32586   [Set-up of grenades value
40750   [Decrement command near
        (see below)
40813   Check if you have 5 or more
        grenades
41658   [Makes sure that you have a
        maximum of 7 grenades.
41667   [Makes sure that you have a
        maximum of 7 grenades.
```

After disassembling at 40749 we get:-

```
40749   LD HL,39616
40752   LD A,(HL)    [Get number of
                     grenades
40753   OR A
40754   JR Z,40766   [Jump to 40766 if
                     no grenades
40756   DEC (HL)     [reduce number of
                     grenades by 1
```

So if we poke 40756 with 0 this should stop you from losing any grenades. If you check this you will find that it does stop you from losing grenades.

If you do the same check for 39617 which is where the number of magazines is stored you will get the following numbers:-

```
40716   [Reduce magazines by 1
40732   [Reduce magazines by 1
41690   [Check of bullets & magazines
41847   [Increase number of magazines
41972   [Check for max of 9 magazines
```

Disassembling from 40716 we get:-

```
40715   LD A,(39617)
40718   LD B,A
40719   OR (HL)
40720   JR Z,40744   [Jump if you dont
                     have any bullets
                     or magazines
40722   DEC (HL)     [Decrease number
                     of bullets
40723   JP P,40736   [Jump if bullets
                     left
40726   LD A,B
40727   DEC A        [Reduce number of
                     magazines
40728   JP M,40744   [Jump if no
                     magazines left
40731   LD (39617),A
40734   LD (HL),32   [Reset number of
                     bullets to 32.
```

To get infinite magazines you can either poke 40727 with 183 or poke 40722 with zero. One will stop the number of magazines from going down and the other stops the number of bullets from going down.

Well that's it for another month and I hope that you have enjoyed reading it as much as I enjoyed writing it. See you next month.

Hugh J. McLenaghan (Hack-Zone),
36 Floorsburn Crescent, Johnstone,
Renfrewshire, Scotland, PA5 8PF.

INSIDE G+DOS

Part 4.

By: Stephen Warr.

In the issue before last I looked at the PLUS D's disc directory. I thought readers would like a useful machine code routine which adds a new BASIC command **CAT [#n;]d1["filename"]** where anything inside square brackets is optional (of course the drive number can be 1,2 or *). Note that the form is **CAT d1** not the existing **CAT 1**. The routine produces an alphabetical catalogue and works by reading each directory entry in turn, inserting room at the correct position in a string of previous entries, and transferring only the data needed to produce the final catalogue. Once the end of the directory is reached the whole string of entries is printed out. The catalogue produced is alphabetically (not ASCII) sorted so that "a" is exactly the same as "A", etc.

The routine is designed to be held completely in PLUS D RAM. To get it there you will have to assemble the code to 12628 but actually store it in normal RAM. After assembly save it by:- **SAVE d1"alpha"CODE address,295**

before loading it back into shadow RAM with:- **LOAD d1"alpha"CODE 12628**

One point to note is that it was written to work only with the latest version (2a) of G+DOS.

```
 10 ;PLUS D ALPHA-CAT.
 20        ORG  12628
 30 ALPHA:LD   B,A
 40        AND  223
 50        CP   "D"
 60        LD   A,B
 70        JP   NZ,9722 ;#25FA
    ;Jump back if character is not a
    ;"d" or "D".  ie. the command is
    ;of the existing form CAT 1
 80        CALL 9721 ;#25F9
 90        CALL 9634 ;#25A2
100        CALL Z,9792 ;#2640
110        CALL 12616 ;#3148
120        CALL 1794 ;#702
    ;Check synatx - exit if editing
130        RST  16
140        DEFW 3503 ;#DAF
    ;Clear screen
150        LD   A,(15875) ;#3E03
160        RST  16
170        DEFW 5633 ;#1601
    ;Select channel
180        LD   HL,MESS1
190        CALL 6027 ;#178B
200        LD   A,(15873) ;#3E01
210        OR   48
220        CALL 6041 ;#1799
230        LD   HL,MESS2
240        CALL 6027 ;#178B
    ;Print top two message lines,
    ;also giving the drive number
250        LD   HL,START
260        LD   (HL),255
270        LD   (LAST),HL
    ;Clear string. 'LAST' points to
    ;the last byte in string
280        LD   A,16
290        CALL 2469 ;#9A5
300        JR   NZ,DONE
    ;Jump if directory is empty
310 LOOP1:LD   (IX+13),1
320        CALL 3479 ;#D97
330        PUSH DE
    ;Save track & sector numbers
340        CALL 1853 ;#73D
350        EX   AF,AF'
360        LD   DE,START
370        LD   C,16
380        EX   DE,HL
    ;A'=filenumber
    ;HL points to start of string
    ;C=displacement between entries
    ;in string
    ;DE points to filename in
    ;current directory entry
390 LOOP2:PUSH DE
400        PUSH HL
410 LOOP3:LD   A,(HL)
```

```
420         OR    32
430         LD    B,A
440         LD    A,(DE)
450         OR    32
460         CP    B
    ;Convert to lower case letters
    ;and compare
470         JR    NZ,NOT
480         INC   HL
490         INC   DE
500         JR    LOOP3
510 NOT   :POP    HL
520         POP   DE
530         LD    B,0
540         JR    C,FOUND
    ;Jump if correct position found
550         ADD   HL,BC
    ;Move to next string entry
560         JR    LOOP2
570 FOUND:PUSH DE
580         DEC   DE
590         LD    A,(DE)
    ;Get file type from directory
    ;entry
600         PUSH HL
610         EX    DE,HL
    ;DE=position in string to insert
    ;new entry
620         LD    HL,(LAST)
630         PUSH HL
640         OR    A
650         SBC   HL,DE
    ;HL=number of bytes above insert
    ;position
660         EX    (SP),HL
670         LD    D,H
680         LD    E,L
690         ADD   HL,BC
700         LD    (LAST),HL
    ;Increase 'LAST' by 16
710         EX    DE,HL
720         POP   BC
730         INC   BC
740         LDDR
    ;Move all entries above insert
    ;position
750         POP   DE
760         POP   HL
    ;DE points to inserted space
    ;HL points to filename in
    ;directory entry
770         LD    BC,10
780         LDIR
    ;Move filename
790         EX    AF,AF'
800         LD    (DE),A
810         INC   DE
820         EX    AF,AF'
830         LD    (DE),A
840         INC   DE
    ;Move filenumber & file type
850         CALL DATA
860         LDIR
    ;Move 4 more bytes of data
870         POP   DE
    ;Restore track & sector numbers
880         CALL 2696 ;#A88
890         JR    Z,LOOP1
    ;Jump if there are more
    ;directory entries
900 DONE :LD    HL,START
910 LOOP4:LD    A,(HL)
920         INC   A
930         JP    Z,1148 ;#47C
    ;Jump to move on to next BASIC
    ;command if reached string end
940         CALL 2459 ;#99B
    ;Print the next 10 bytes as a
    ;filename
950         CALL 6039 ;#1797
960         LD    A,"P"
970         CALL 6041 ;#1799
980         PUSH HL
990         LD    L,(HL)
1000        LD    H,0
1010        LD    A,32
1020        CALL 5970 ;#1752
    ;Print HL - the filenumber
1030        POP   DE
1040        INC   DE
1050        LD    A,(DE)
    ;Get the file type
1060        INC   DE
1070        PUSH AF
1080        CALL DATA
1090        EX    DE,HL
1100        LDIR
    ;Move data back to current
    ;directory entry in PLUS D RAM
1110        CALL 6039 ;#1797
1120        CALL 6039
1130        POP   AF
1140        PUSH HL
1150        CALL 5787 ;#169B
    ;This call takes the file type
    ;from A and prints "BAS","CDE",
    ;"SNP 48K",etc. If the file is
    ;CODE or BASIC the routine also
    ;picks up the start & length or
    ;auto-run address from the
    ;current directory entry and
    ;prints them
1160        POP   HL
    ;HL points to next string entry
1170        JR    LOOP4
1180 DATA :DEC    A
```

```
1190        LD   A,216
1200        JR   Z,SKIP
     ;Jump if file is a BASIC program
1210        LD   A,212
1220 SKIP :LD    (IX+13),A
1230        CALL 3479 ;#D97
1240        LD   BC,4
1250        RET
     ;Only CODE requires 4 extra data
     ;bytes - start & length, BASIC
     ;requires 2 - the auto-run line
     ;number, all others require no
     ;extra data at all.
1260 MESS1:DEFM " PLUS D ALPHA"
1270        DEFM "-CATALOGUE,"
1280        DEFM "DRIVE",":"+128
1290 MESS2:DEFM 13,"----------"
1300        DEFM "----------"
1301        DEFM "----------",13+128
1310 LAST :DEFW 0
1320 START:EQU  13566 ;#34FE
     ;Each entry in the string takes
     ;up 16 bytes so with 80 files
     ;on a disc, a maximum space of
     ;1280 is required +1 for
     ;the end marker
```

When you have it safely in the PLUS D's RAM, set it working with **POKE @1154,12628** and then try it out with **CAT d1.**

In use the routine will be entered with IX already holding 15043 (see above), the optional channel (#n;) has been dealt with and loaded to 15875 (default=2), and the filename has been given a default of "*". There are a number of calls to routines in G+DOS, mostly dealing with syntax checking, but as I think I have run out of space I will explain them next month. Of course you don't need to type in the program comments (given after the line(s) they refer to) so I have not given them line numbers.

For those of you without an assembler I've just managed to squeeze in a Basic poke program. Dont come to rely on this sort of service, I wont always have the space. Besides, working with machine code without an assembler is just asking for headaches.

```
 10 READ add: LET add=add-8192
 20 LET line=1010
 30 LET s=0: FOR f=1 TO 20
 40 READ d: POKE @add,d
 50 LET s=s+d: LET add=add+1
 60 NEXT f: READ ch
 70 IF s<>ABS ch THEN PRINT "ERROR I
    N LINE ";line: STOP
 80 LET line=line+10
 90 IF ch>=0 THEN GO TO 30
100 POKE @1154,12628
110 CAT d1
1000 DATA 12628
1010 DATA 71,230,223,254,68,120,194,2
     50,37,205,249,37,205,162,3
     7,204,64,38,205,72,2925
1020 DATA 49,205,2,7,215,175,13,58,3,
     62,215,1,22,33,57,50,205,1
     39,23,58,1592
1030 DATA 1,62,246,48,205,153,23,33,8
     7,50,205,139,23,33,254,52,
     54,255,34,121,2078
1040 DATA 50,62,16,205,165,9,32,91,22
     1,54,13,1,205,151,13,213,2
     05,61,7,8,1782
1050 DATA 17,254,52,14,16,235,213,229
     ,126,246,32,71,26,246,32,1
     84,32,4,35,19,2083
1060 DATA 24,242,225,209,6,0,56,3,9,2
     4,231,213,27,26,229,235,42
     ,121,50,229,2201
1070 DATA 183,237,82,227,84,93,9,34,1
     21,50,235,193,3,237,184,20
     9,225,1,10,0,2417
1080 DATA 237,176,8,18,19,8,18,19,205
     ,40,50,237,176,209,205,136
     ,10,40,165,33,2009
1090 DATA 254,52,126,60,202,124,4,205
     ,155,9,205,151,23,62,80,20
     5,153,23,229,110,2432
1100 DATA 38,0,62,32,205,82,23,209,19
     ,26,19,245,205,40,50,235,2
     37,176,205,151,2259
1110 DATA 23,205,151,23,241,229,205,1
     55,22,225,24,206,61,62,216
     ,40,2,62,212,221,2585
1120 DATA 119,13,205,151,13,1,4,0,201
     ,32,80,76,85,83,32,68,32,6
     5,76,80,1416
1130 DATA 72,65,45,67,65,84,65,76,79,
     71,85,69,44,68,82,73,86,69
     ,186,13,1464
1140 DATA 45,45,45,45,45,45,45,45,45,
     45,45,45,45,45,45,45,45,45
     ,45,45,900
1150 DATA 45,45,45,45,45,45,45,45,45,
     45,45,45,141,0,0,0,0,0,0,0
     ,-681
```

Back with more PLUS D secrets soon.

YOUR LETTERS

Dear Editor,

When is a disc drive not a 'Lifetime Drive'? I have always been under the impression that the vast majority of drives use the Shugart Standard 34 way edge connector for controlling the drive. My experiences cover TEAC, SEIKO and OLIVETTI drives.

So what makes MGT's new LIFETIME drives so different? Why are they 'Lifetime' and others are not?

Yours Sincerely, Jonathan Butler.

The Shugart Standard refers to the controlling signals not to the cable connections. Atari ST, Amega, BBC, IBM and most other computers use the Shugart signal standard, but each have different cable and connectors at the computer end.

In the past dealers have needed to stock disc drives for all the major computers. This ties up money in large stocks but you can bet your last dollar that the one drive you want will be out of stock. Now the LIFETIME drives have solved the problem. One drive, several cables and external (rear mounted) dip switches to set up the drive's parameters. MGT also provide what must be the best technical manual I've ever seen given away with a drive.

It is true to say that most drives can be fitted to most computers. But it is often beyond the normal users ability to open the drive, change the cable, and then make/break links or work out which switches to alter. ***Ed.***

Dear Editor,

I am writing to FORMAT for two reasons. First an appeal for help in obtaining a copy of the 'Snapshot Compressor' that was advertised by MGT (they no longer stock it).

My second reason is to thank you and all your contributors. My main reason for buying a PLUS D and disc drive had been to save time in loading commercial games, but since joining INDUG a wider and more useful area of computing has been made easily available to me. My eyes have really been opened by FORMAT. Many thanks.

Yours Sincerely, R.D.Jones.

Dear Editor,

Yes, you were so right when you refer to the BBC's apparent bias. I say "apparent" because I think it is more to do with careless and lazy research.

Maybe you also saw the BBC offering "Memories of a Museum Dog", one of the Omnibus series (transmitted 27/5/89). This attempted to tell the story of gramophones and records from the angle of the famous HMV dog "Nipper". OK, as a Decca recording engineer of some 36 years and having built my own disc-cutting gear in the late '40s, I am in a position to judge the accuracy of such a programme. I expected it to have an HMV slant, and nothing wrong in that, since the theme of Nipper ran through it. But in the event it was so full of inaccuracies and downright untruths that I felt compelled to write to the producers. My letter elicited a reply which tried like hell to justify some of my criticisms and ignored those which it couldn't.

The moral is: don't believe BBC specialised documentaries. The research will be abysmal. The "researchers" will not check any information supplied, and therefore a biased inaccurate account is certain.

Yours Sincerely, Jack Law.

Dear Editor,

Can you print more articles on printers, how they work, what are printer control codes? Which printer is best. etc. Its an area I cant make sense of.

Yours Sincerely, T.S. West.

Letters printed may be edited for length or clarity.

THE SECRETS OF WORD MANAGER

SPECTRUM MACHINE CODE MADE EASY

Part 4.

By: Francis Miles.

ARITHMETIC. - Part 2.

A much more difficult bit of arithmetic is performed by a "Word Manager" subroutine called ENDS. The reason for this subroutine is that "Word Manager" stores text, whether in memory or on tapes, as a continuous string with no indication where the newline comes; when it puts text on screen or prints it out, it makes a newline at the end of every 64 characters (or whatever the current print line length may be).

However, it is sometimes necessary for the program to find the start or end of a line: eg on the command STOP, "Word Manager" has to move the cursor from wherever it is standing to the first character of the current line. If the cursor is on the 17432th character of the text, and the current print line length is 62 characters, the first character of the line will be the 17423th, because 17423 = 281 x 62 + 1.

ENDS performs a sum which in BASIC you would write as:-

```
LET HL = LINEP*INT(HL/LINEP)
```

(LINEP is the "Word Manager" system variable holding the selected print line length.) This is a much more difficult sum in machine code than in BASIC, because Z80 assembly language has no direct commands for "multiply" or "divide", let alone finding the INTeger of a number; the subroutine may look pretty cumbersome compared with the BASIC version, but in fact it works a damn sight quicker.

```
5380 ENDS   EQU $
5390 ;Move HL (text address) to the
5400 ;end of the previous line.
```

["Text address" merely means HL is counted from "text zero", rather than being a RAM address. I found it necessary to constantly remind myself of this distinction whenever handling an address in the text buffer.]

```
5410        PUSH DE
5420        PUSH BC ; BC/DE
```

[BC and DE are kept on the stack till the end of the subroutine; they're ignored in the notes till the end.]

```
5430        EX DE,HL ;now DE=TA (text
address)
```

[Skip a bit here dealing with the case where TA is in the first line of the text.]

```
5510 ;Stack increasing doubles
5520 ;of LINEP.
5530        INC HL
5540        PUSH HL ; 1
5550        LD HL,(LINEP)
5560        LD H,0
5570 EN.LP  PUSH HL ;doubles/1
5580        ADD HL,HL
5590        JR NC,EN.LP
```

[Consider the effect of lines 5510-90 if LINEP is 62. There will be a pile of numbers on the top of the stack, with the biggest at the top:

```
63488
31744
15872
 7936
 3968
 1984
  992
  496
  248
  124
   62
    1
```

Each of these except the bottom two is twice the one below; 1 marks the end of the pile. The next number 126976 doesn't get put on the stack because it's bigger than 65535, so ADD HL,HL (line 5580) produced a carry.]

```
5600 ;Pop one by one and accumulate,
5610 ;not exceeding TA-1.
```

[What I shall do now is take the numbers off the stack and try adding each of them in turn, except the end marker 1, to the accumulator; if the result comes out bigger than TA, that number is discarded, otherwise it's kept. It's a fact, which you can check for yourself if you like, that every multiple of 62 less than 65536 is a sum of some selection of the numbers in this pile; and that you can reach this multiple by following the procedure I describe. This procedure is a variant of what is often called "Russian multiplication". Some form of Russian multiplication is often used for multiplying with Z80 chips - though it is not used by the "floating point calculator".]

```
5620        LD A,1
5630        LD HL,0
```

[A is 1 to check for the end marker; HL is now the accumulator.]

```
5640 EN.LP2 POP BC ;till 1 reached
5650        CP C
5660 ;If C=1 the stack is cleared.
5670        JR Z,EN.RET
5680        ADD HL,BC
5690        JR C,EN.ACG
```

[If adding the latest double makes the accumulator more than 65536, the double must be discarded.]

```
5700        SBC HL,DE ;ACC-TA
5710        JR NC,EN.ACC
```

[If there was no carry, the accumulator is bigger than TA, and the latest double from the stack must be discarded (lines 5760-5780).]

```
5720 ;Accumulator is less than TA.
5730        ADD HL,DE ;HL=ACC again
5740        JR EN.LP2
5750 ;The accumulator is >= TA.
5760 EN.ACC ADD HL,DE ;HL=ACC again
5770 EN.ACG AND A
5780        SBC HL,BC;ACC-last double
5790        JR EN.LP2
5800 ;HL is now on the end of the
5810 ;previous line.
```

[EN.RET, the exit from the subroutine, is only reached from line 5670, so the stack has been cleared apart from the BC and DE which were put on it at entry.]

```
5820 EN.RET POP BC
5830        POP DE ; -
5840        RET
```

"Russian multiplication" looks completely mad at first sight, but you can make sense of it by thinking in terms of binary arithmetic. The top double on the stack, 63488, is 1024 times 62; 1024 is 100,0000,0000 in binaries. The doubles below it are respectively:- 10,0000,0000B times
1,0000,0000B times
1000,0000B times
100,0000B times
... and so on.

Adding any selection of these numbers gives you a binary number times 62; the procedure in the subroutine gives you 1,0001,1001B times, which is 281 times: and this is the right answer. I suppose this subroutine is really a monument of misplaced ingenuity. If I had used the FP calculator it could have been done like this:-

```
5380 ENDS   EQU $
5390 ;Move HL (text address) to end
5400 ;of previous line.
5410        PUSH DE
5420        PUSH BC
5430 ;Put TA on calculator stack.
5440        LD B,H
5450        LD C,L
5460        CALL 11563 ;STACK.BC
```

[The calculator stack is a special stack which the Spectrum keeps in RAM beyond the machine stack (the one you work with PUSH and POP). Unlike the machine stack, numbers put on the calculator stack are five bytes each,

and in "floating point format". There are several ways of putting numbers on the stack, but for integers (positive numbers, not fractions) the simplest are 11563 STACK.BC for two-byte numbers and 11560 STACK.A for one-byte numbers.]

```
5470 ;Put LINEP on calc stack.
5480        LD A,(LINEP)
5490        CALL 11560 ;STACK.A
```

[Now we can use the FP calculator RST 38H, which always works with numbers from the calculator stack - and puts its results on the stack, usually overwriting the top number in doing so. Like the "Word Manager" P.BY subroutines explained in "Printing messages", it works by "popping the return address"; it must be followed by a series of bytes specifying the calculations to be performed, ending with 56, which is called "end-calc". A list of the calculator codes (called "offsets") will be found on page 190 of "The Complete Spectrum ROM Disassembly" - all in hexadecimals.]

```
5500 ;Calculate LINEP*INT(HL/LINEP).
5510 ;Stack holds (from top): LP,TA
5520        RST 38H
5530        DEFB 192 ;st-mem-0 LP,TA
5540 ;Now LINEP is in mem-0.
```

[The calculator also uses a special memory area, 30 bytes starting at 23698. This can hold up to six different numbers in five-byte FP format, in six locations called mem-0, mem-1, ... mem-5.]

```
5550        DEFB 05 ;divide TA/LP
```

["Divide" divides the top of the stack into the next numberdown. The result is put on the stack replacing both the two numbers - that's why we put LINEP in mem-0, because we want it again in a minute.]

```
5560        DEFB 39  ;int INT(TA/LP)
5570        DEFB 224;get-mem-0 LP,INT
5580        DEFB 04  ;multiply LP*INT
```

[Again, the result replaces both numbers on the stack - but we don't care, because this is the answer.]

```
5590        DEFB 56 ;end-calc
5600 ;Get answer from top of stack.
5610        CALL 11682 ;FP.TO.BC
5620        LD H,B
5630        LD L,C
```

[Again, there are several ways of getting a number from the calculator stack. In this case we know the answer is an integer and not too big to go into BC, so 11682 FP.TO.BC will be all right.]

```
5640 ;Finished.
5650        POP BC
5660        POP DE
5670        RET
```

This is obviously quite a few bytes shorter than my fantastic subroutine; why don't I put it in "Word Manager"? Well,

1. I think mine is quicker - the FP calculator's "multiply"and "divide" are rather slow.

2. "Word Manager" sets RAM.TOP as low as possible, to leave plenty of room for text, and some users like to add a little extra BASIC for various purposes. There could well be no room for a calculator stack.

3. I like my routine better!

Arithmetic in machine code is a very broad subject and I have only scraped the surface in these two articles. However I hope I have shown you that its not impossible to include quite complex calculations in your programs.

Next month I will be looking at LOOPS.

Continued from page 6.

excellent, is medieval in terms of the rapidly changing computer era. OMNICALC was conceived when all Spectrums had rubber keys and no-one knew of additional cursor control. Hence, the now customery arrows operates as if you pressed CAPS 5 - 8. In other words cursor keys are only partially effective. To reach the edges of your spreadsheet you will have to revert to using keys 5 through 8. Regrettably the conversion program will not cure this shortcoming.

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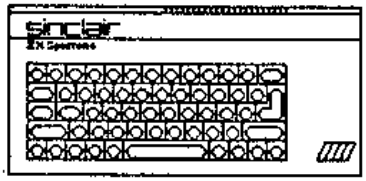

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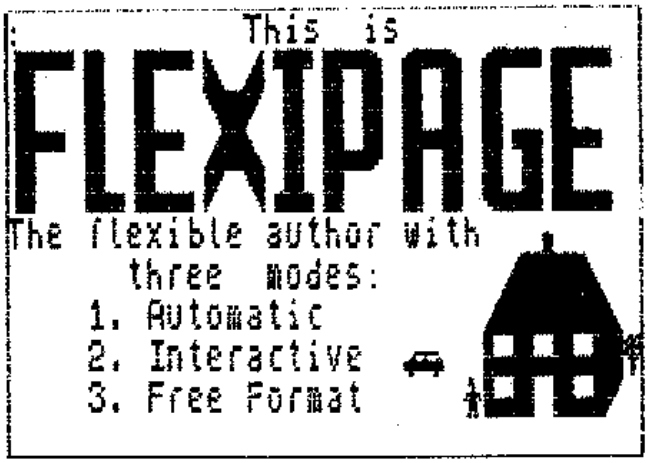
FLEXIPAGE
Reviewed

By: John Wase.

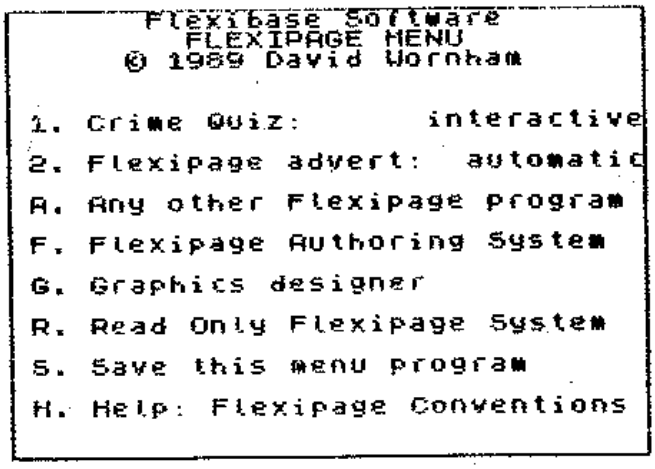
Flexipage is a program written by David Wornham, a police superintendent who has a lot to do with Community Policing. He wanted a way of displaying a screen with simple graphics and a message large enough to be read by a number of people, like "You see someone snatching an old lady's bag - do you"

a) Ring 999? (127)
b) Hit him? (128)
c) Run? (129)

Pressing the number gives the next screen in the sequence, and so on. So he wrote a program which would do this (interactive mode). It would also automatically display a series of screens, to provide, for example, a shop-window advert (automatic mode). And it would also allow an operator to select screens for more complex displays (free format). He called the program "Flexipage".



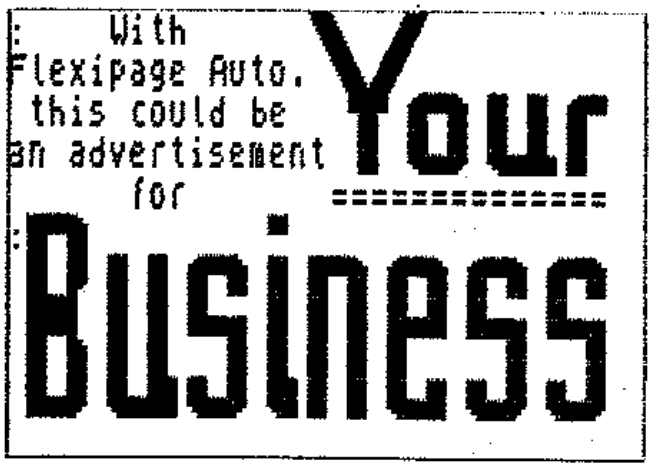
I reviewed this program some time ago in Popular Computing Weekly (16th March, 1989). Already, it's moved on. For instance, I criticised the instructions which came as two A5 booklets and a lot of odd bits of paper. Now they've been combined into one booklet: I was provided with a pre-release copy, together with an autorunning 3.5" disc for the PLUS D. The demo program has been changed: it's got a neater intro screen and the menu you first hit has an extra item (Read- only system; not implemented on my disc, though). There are also some other more subtle changes to other features either implemented or on the way, but more of these later.



The basic principles of the Flexipage authoring system are as follows: up to 200 half screens, originally input as 5 lines are displayed double height, so text can easily be read at a distance. The program therefore holds 100 screens, since pairs can be displayed together - pretty good. The last three columns on-screen can contain control codes which are not displayed, but control outputs such as paper or ink colour, pause length for which that screen is shown, warning tone (police beep, telephone warble and three-tone alarm), and score - which it will also print out in a final personalised certificate, since the first thing a Flexipage interactive display does is to demand your name!

There is also a library of graphics to assist with the production of the

rather crude, chunky displays, and you can make as many more as you like using the Flexipage Graphics designer.



Well, how did it all work? Pretty well on the whole. As I explained in the "Popular" review, the system is a bit tetchy about putting in the crude, chunky, teletext-like graphics which have to be input through a very slow "amend" mode; there is only one large type-size, and there are no fancy rolling or scrolling: the input routines, too, are at times inconsistent. All this is largely due to the compromises the author has had to make - after all, you can only store about five uncompressed screens as code in a Spectrum - this program gives you a hundred, plus a lot of organisation and flexibility. So with these memory limitations, the author is faced with losing screens if amendments to his original BASIC increase its length (as compiling certainly would).

Author David Wornham tells me that by the time you read this, you will be able to make copies direct to tape or disc via the main menu, and you should be able to get round those chunky graphics - he's almost sorted out routines to grab whole or part screens from any SCREEN$ you care to put in. This should considerably enhance the graphics possibilities.

So, in summary - a usable and stimulating package - with many uses in education or business. Good value at £10.50, (disc version £2.00 extra) from:-

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SWIPE!

By: Shimon Young.

This routine produces some remarkable screen effects on 128k machines. As detailed in my last article, the 128 has a second screen which can be put to various uses. This program uses it to do a smooth, hi-res colour wipe between pictures.

The principle is the same as the old 48k hi-res colour effects. Every 1/50 of a second, the Spectrum jumps to a routine that carefully waits for the TV to reach a certain scan position on the screen and then changes the colours in the display so it appears to have a colour resolution higher than 8*8.

The timing for these programs has to be very precise. With the 48k, machine code programmers knew that there were 224 T-states per scan line. However, the 128s run slightly faster, so these effects fail to work with old programs, eg. the fancy borders on Paperboy and Starion.

Rather than sitting down and calculating how many T-states were needed on a 128, I settled for trial and error. Any masochists wishing to work out how many are used from my assembly listing may feel free to do so.

The first part of the program is an interrupt and can be used on its own. If you wish to create your own effects with it, you only have to poke 48915 with the number of lines down you want the split to happen at plus 48. Therefore the bottom of the screen is 240 or 192 + 48.

The assembler source code given here is for the Hisoft Gens assembler, you may need to make slight adjustments for your own assembler.

THE SOURCE CODE

```
 10 *C-
 20 *D+
 30         ORG  48895
 40         DEFW MIRCLE
 50 MIRCLE  PUSH AF
 60         PUSH BC
 70         LD   A,(23388)
 80         XOR  8
 90         LD   BC,32765
100         OUT  (C),A
110         LD   B,250
120 LOOP3   DJNZ LOOP3
130         NOP
140 YPOS    LD   B,48
150 LOOP    LD   C,10
160 LOOP2   DEC  C
170         NOP
180         JR   NZ,LOOP2
190         LD   (0),A
200         DJNZ LOOP
210         XOR  8
220         LD   BC,32765
230         OUT  (C),A
240         RST  56
250         POP  BC
260         POP  AF
270         RETI
280 *L+
290 START   LD   A,190
300         LD   I,A
310         IM   2
320         RET
330 WIPEUP  LD   B,240.
340         CALL END
350         CALL START
360 LOOOP   LD   A,B
370         LD   (YPOS+1),A
380         HALT
390         DEC  B
400         CP   48
410         JR   NZ,LOOOP
420         JR   END2
430 WIPEDN  LD   B,48
440         CALL START
450 LOOOP2  LD   A,B
460         LD   (YPOS+1),A
```

```
470         HALT
480         INC  B
490         CP   240
500         JR   NZ,LOOOP2
510         JR   END
520 BOUNCE  LD   D,#96
530         LD   B,#30
540         LD   C,0
550         CALL START
560 LOOP1   DEC  D
570         JR   Z,END
580         LD   A,B
590         LD   (YPOS+1),A
600         HALT
610         INC  C
620         BIT  7,A
630         JR   Z,BLOOP2
640         BIT  7,C
650         JR   NZ,BLOOP2
660         AND  #7F
670         ADD  A,C
680         CP   #71
690         SET  7,A
700         LD   B,A
710         JR   C,LOOP1
720         JR   BLOOP3
730 BLOOP2  ADD  A,C
740         LD   B,A
750         JR   LOOP1
760 BLOOP3  LD   B,#F0
770         LD   A,C
780         NEG
790         ADD  A,3
800         LD   C,A
810         JR   LOOP1
820 END     LD   A,1
830         LD   (YPOS+1),A
840         LD   A,(23388)
850         XOR  8
860         LD   (23388),A
870 END2    IM   1
880         RET
```

If you don't have an assembler, just type in the BASIC listing (Program 1) which will save the code to disc when it has read all the data statements. If you make a mistake typing, the program will identify which line you did wrong and stop.

PROGRAM 1 - CODE LOADER.

```
10 LET a=48895: FOR z=0 TO 7: LET ck=
   0: LET w=1
20 FOR a=a TO a+19: READ b: POKE a,b:
    LET ck=ck+w*b: LET w=w+1
30 NEXT a: READ b: IF b<>ck THEN GOTO
   50
40 NEXT z: PRINT "Press a key to save
   ": PAUSE 0: SAVE d1"Wipecode"CODE
   48895,156: STOP
50 LET z=z*10+100: PRINT "Error in Li
   ne ";z: STOP
100 DATA 1,191,245,197,58,92,91,238,8,
    1,253,127,237,121,6,250,16,254,0,6
    ,23507
110 DATA 48,14,10,13,0,32,252,50,0,0,1
    6,245,238,8,1,253,127,237,121,255,
    26723
120 DATA 193,241,237,77,62,190,237,71,
    237,94,201,6,240,205,139,191,205,4
    3,191,120,32146
130 DATA 50,19,191,118,5,254,48,32,246
    ,24,82,6,48,205,43,191,120,50,19,1
    91,21018
140 DATA 118,4,254,240,32,246,24,52,22
    ,150,6,48,14,0,205,43,191,21,40,40
    ,15538
150 DATA 120,50,19,191,118,12,203,127,
    40,16,203,121,32,12,230,127,129,25
    4,113,203,27383
160 DATA 255,71,56,229,24,4,129,71,24,
    223,6,240,121,237,68,198,3,79,24,2
    13,23756
170 DATA 62,1,50,19,191,58,92,91,238,8
    ,50,92,91,237,86,201,0,0,0,0,15848
```

PROGRAM 2 - A DEMO

```
 1 REM By: SHIMON YOUNG
 2 REM For 128 Spectrums Only.
10 CLEAR 48894: LOAD d*"WIPECODE"CODE
20 POKE 23388,16+7: LOAD d*"Screen 1"
   CODE 49152: REM Select Bank 7 and
   load in screen
25 LOAD d*"Screen 2"SCREEN$ : REM loa
   d in normal screen
30 RANDOMIZE USR 48966: REM WIPE DOWN
40 RANDOMIZE USR 48946: REM WIPE UP
50 RANDOMIZE USR 48983: REM BOING!
60 GOTO 30
```

To use the routine there are three entry points as shown in the second BASIC listing. USR 48946 does a wipe upwards, USR 48966 wipes downwards and USR 48983 makes the dividing line bounce off the bottom of the screen. The programs turn on and off the interrupt automatically and change system variable BANKM to the other screen. You can change the program so it loads in screens from tape or microdrive instead.

Have fun!

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